the same localities show a fairly wide margin of variation; I am, therefore, not adopting Mathews' subspecific name of *hartogi*.

ZEBRA FINCH *(Taeniopygia castanotis)*.

This species was common at the wells, but one example only was collected on the island; the same species was also numerous on Peron Peninsula, but I cannot note any characters distinguishing examples I secured there and on the Murchison from the form we have in South Australia, so am not making use of Mathews' name *hartogi*.

LITTLE CROW *(Corvus bennetti)* (?).

We did not collect any specimens on the island, and therefore the identification of the island bird with this crow is uncertain. As there are no trees on the island, the crows we saw were nesting on most of the windmills.

NOTES ON THE FAUNA OF DIRK HARTOG ISLAND, WESTERN AUSTRALIA.

No. 3.—POLYPLACOPHORA.

ACANTHOCHITON BEDNALLI JOHNSTONI Ashby.

Acanthochiton bednalli, var. *johnstoni,* Ashby (Trans. Roy. Soc. S. Austr., vol. xlvii., p 231, 1923).

This shell was described by the writer as a variety of *A. bednalli,* from three examples that were collected by W C. Johnston at about half way between Carnarvon and Maud Landing; I now suggest treating this western form as a subspecies.

Definition.—Differs from *A. bednalli* s.s., in that the dorsal area in this form, from the beak forwards for about half the length, is ornamented with longitudinal rows of elongate, squamose granules, which then for a short distance in some examples shows a little longitudinal grooving which is replaced by a smooth surface, except for transverse growth ridges. The consistent deep longitudinal grooving, that is so typical of *bednalli,* is in this form absent; also, the fringe spicules of the girdle are decidedly coarser than *bednalli* s.s. This description is made from an example collected by the writer at Woodman's Point, near Fremantle, because the type from North of Carnarvon had the dorsal area eroded, this example now becomes the neotype.

Two juvenile examples were obtained on rocks, at low tide, four miles south of the homestead on the island. The smaller, which measures only 3 mm. in length, possesses such a broad dorsal area that it is with hesitation that the writer assigns it to this species, but the larger, which is curled and measures about 5 mm. in length, seems quite typical of this subspecies.

NOTOPLAX SUBVIRIDIS Torr.

Acanthochites subviridis Torr (Trans. Roy. Soc. S. Austr., vol. xxv., p. 104, 1911).

One example in excellent preservation, measuring, dry, 12·5 mm. in length, was obtained four miles south of the homestead, it is a typical specimen. The occurrence of this rare *Notoplax* at Dirk Hartog Island extends our knowledge of its range of habitat nearly 600 miles northwards. The only previous records were the four specimens collected by Torr at Albany, 1910, and three by the writer at Yallingup in 1929.

ISCHNOCHITON CARIOSUS Pilsbry, 1892.

Iredale and Hull make Dall the author of the name *cariosus*, but as far as I can ascertain this name as used by Dall was a *nomen nudum*, in which case the author is Pilsbry, 1892.

The action of Iredale and Hull in giving generic rank to the name *Heterozona* has not up to the present been justified by any definitions supplying distinctions of generic status. Pilsbry (Man. Con. xiv., p. 65) treated *Heterozona* as a subgenus of the genus *Ischnochiton*, proposed by Dall, 1873 (Table of Regular Chitons, 1873), Pilsbry accepting the name as of subgeneric value on account of the "girdle bearing small scales with large striated scales intermingled," but later, in vol. xv., p. 82, he treats the name *Heterozona* as a section of the genus *Ischnochiton* only.

As the two other species which Iredale and Hull include in their genus *Heterozona*, namely *I. fruticosus* and *I. subviridis*, neither possess the character of "intermingled large girdle scales," such treatment is without justification. The main character on which Pilsbry's section *Heterozona* was founded, "the intermingling of large scales," seems to be in this case only a specific character, which does not occur in *I. fruticosus*, its nearest ally.

ISCHNOCHITON CARIOSUS, var. OCCIDENTALIS, Ashby.

Ischnochiton (Heterozona) cariosus, var. *occidentalis*, Ashby (Trans. Roy. Soc. S. Aust., vol. xlv., pp. 41-2, 1921).

Of this variety six examples were taken at 4 miles south of the homestead and at Surf Point, the southern extremity of the island. These all show the stronger sculpture characteristic of this variety, which the writer has now collected at the following localities on the western coasts of the western State:—Ellensbrook, Yallingup, Rottnest Island, Dongarra, Geraldton, and now as far north as Shark Bay on Dirk Hartog Island. The limits of the range of *I. cariosus* correspond with the limits proposed by the writer for his Indo-Australian Region, interlapping with the Adelaide Region (A. Ass. Adv. Sci., vol. 17, p. 374, 1924).

The largest of the Dirk Hartog Island shells measures 22 x 12 mm., this example showing none of the "large scales," although the next smaller in size exhibits this feature. Sufficient collecting has not been done along the southern coast of Australia to determine whether *occidentalis* deserves subspecific rank or whether it is only the extreme of a gradual variation.

ISCHNOCHITON TINDALEI Ashby.

Ischnochiton tindalei Ashby (Trans. Roy. Soc. S. Austr., vol. xlviii., p. 323-4, 1924).

Two examples were obtained of this shell, that has hitherto been only known from the damaged holotype from Groote Eylandt in the Gulf of Carpentaria; these two were obtained on rocks at low tide four miles south of the homestead.

This species is near to *I. luticolens* Hull, but is separable by the character of the sculpture and the more raised lateral areas; the granules in the lateral areas and end valves in *I. luticolens* are shallow and flattened, whereas in *I. tindalei* they are strongly convex; this character, although in a less degree, applies to the sculpture of the other areas; also, in *I. tindalei*, the grains are more crowded. The two examples from Dirk Hartog Island are hardly as strongly sculptured as is the type, this may be due to juvenility, or it may be that when a larger series is available sufficient variation in *I. tindalei* may be found to cause one to grant this form subspecific rank only. The two examples under discussion have not been disarticulated, so I cannot say whether they show the same distinction in the slitting of the insertion plate that was noticed in the holotype.

Cryptoplax hartmeyeri Thiele.

Thiele (Die Fauna Südwest-Australiens, Polyplacophora, Band iii., L. ii., pp. 405-6, 1911).

Dr. J. Thiele, in his description, records three examples collected by Drs. Michaelsen and Hartmeyer; one came from Surf Point, the southern extremity of Dirk Hartog Island, but the locality of the other two is unknown, probably also from Shark Bay. These three specimens have hitherto been the only examples known, and are, I understand, in the Berlin Museum.

I was successful in collecting two at Surf Point (the type locality), and one between that spot and the homestead, about four miles south of the latter. Those from Surf Point measure, respectively, dry, 45 and 25 mm. in length, and were taken off limestone or coral rock at low water, on the inner side of Surf Point on the island side (north) of the South Channel. The third example was found almost completely buried in the hole of some rock borer, in a piece of hard limestone, at four miles south of the homestead; the animal so completely filled the hole into which it had forced its way that it was with much difficulty got out without damage, and is now preserved in spirit. This example only measures, in its curled condition, 20 mm. in length, although really the second largest of the three taken. Valves 5, 6, and 7 are in this specimen as in life and show as mere spots, nearly buried in the spiculose girdle. I cannot distinguish between this and the figure in Reeve's Icon., 1847, *Chitonellus*, pl. i., fig. 3, which figure is understood to represent *C. burrowi* Smith.

Thiele, while admitting that *C. hartmeyeri* is nearly allied to *C. burrowi*, says "the valves and also the spicules on girdle are distinctly different," but it is unfortunate that he does not indicate the characters of these differences. Unfortunately, I have never seen an example of *C. burrowi*, neither have I seen drawings or descriptions of the characters of the girdle spicules of that species and, therefore, am not in a position to express any opinion. In 1924 (l.c. vol. xlviii. pp. 239-240) the writer described and figured a minute *Cryptoplax* from about 30 miles north of Carnarvon, North Shark Bay, suggesting that it might be identified with the still more minute form partially described by Thiele under the name *C. michaelseni*, in 1911. I now realize that, although the valve sculpture of this juvenile specimen from north of Carnarvon appears to differ considerably from adult *C. hartmeyeri*, the peculiar flattened, adpressed spicules, whose character was especially emphasised in my description in 1924 l.c., correspond exactly with those of *C. hartmeyeri*, of which I now have specimens. The fact that in the juvenile form all the valves touch one another, did not at all suggest that species, in which the last four valves are so widely separated, but now I am satisfied that this Carnarvon example is the juvenile form of *C. hartmeyeri*.

Cryptoplax michaelseni Thiele.

Thiele (Die Fauna Südwest-Australiens, l.c.p. 404, pl. vi., figs. 11-17).

I called Dr. Thiele's attention to the statement of Iredale and Hull: "That the Thielean figures here reproduced absolutely prove that Thiele's species is not a *Cryptoplax*." To this Dr. Thiele replies, under date June 25, 1928: "The foremost part (anterior valve) has three incisions (slits), all the rest are without them; in my opinion the species should be placed in *Cryptoplax*."

With the additional light thrown upon the subject by the discovery that the juvenile shell from north of Carnarvon is the juvenile stage of *C. hartmeyeri*, I have re-examined Thiele's figs. of his *C. michaelseni* and, if as seems probable, his specimen was one-third only the size of Ashby's Carnarvon shell, the figures would fairly well represent a juvenile shell of *C. hartmeyeri* of about 2 mm. in length. Also Thiele's figures of the spicules of the two species closely correspond with each other, if one allows for the extra magnification of the spicules

of *C. michaelseni,* which is two to three times that of his figures of *C. hartmeyeri.* Thiele explains that he was quite unaware that the minute specimen he called *C. michaelseni* was a *Cryptoplax* until the disarticulation of the valves revealed the fact that the insertion plates were those of a *Cryptoplax* and not those of an *Acanthochiton,* this probably accounts for the omission of full measurements of the animal.

In conclusion.—I have demonstrated that *C. hartmeyeri* possesses a specialized form of girdle spicule which is flat, adpressed, and grooved; that this peculiar form of spicule also clothes the girdle of Ashby's shell which he identified with *C. michaelseni* Thiele, and now the additional study of Thiele's figures supports the assumption that the minute type of *C. michaelseni* also possessed similar specialized girdle spicules. In face of these facts, we have to consider that these are different stages of growth of one species, and we have reached the following conclusions:—

(a) That Iredale and Hull referred *C. michaelseni* to the genus *Acanthochiton* without the slightest supporting evidence.

(b) That Ashby's shell, which he identified with *C. michaelseni,* is conspecific with *C. hartmeyeri.*

(c) That *C. michaelseni* is the very juvenile form of *C. hartmeyeri.*

(d) Unfortunately, *C. michaelseni* has page precedence over *C. hartmeyeri,* which, under International rules, necessitates our accepting *C. michaelseni* Thiele, as the name of the shell, *C. hartmeyeri* becoming a synonym thereof.

LOPHOCHITON JOHNSTONI Ashby.

Lophochiton johnstoni Ashby (Trans. Roy. Soc. S. Austr., vol. xlvii., 233-6, 1923).

Iredale and Hull propose to recognise in this shell, *Chiton coccus* Menke, a species that was never figured and the type of which was lost. Menke's description will equally apply to Hull's *Callistochiton granifer,* to Thiele's *Callistochiton recens,* or almost any *Callistochiton. C. recens* Thiele was described from Shark Bay in 1911, *L. johnstoni* Ashby from same locality in 1923, and *L. granifer* Hull described as a *Callistochiton* from Queensland, also in 1923, but publication of his name precedes Ashby's by a few months.

I prefer to follow Pilsbry and relegate *C. coccus* Menke to the list of "Insufficiently described chitons, and species of unknown generic position." Thiele's *C. recens* was not figured but, as the type is still in existence, I sent one valve of the holotype of *L. johnstoni* and the single example taken by the writer on pearl-shell, dredged in Shark Bay, during the trip. also a specimen of Hull's *granifer* for comparison with Thiele's type. He writes me as follows:—"My *Callistochiton recens* appears to differ from the *Lophochitons granifer* and *johnstoni* in the weaker sculpture and the relatively broader and shorter middle valve, without noticeable radiable ribs."

I only secured the single example off pearl-shell that had been dredged in the bay between Dirk Hartog Island and the mainland; my opportunity of examination was limited to about half an hour, more available time would probably have led to further discovery. The specimens obtained 11·5 x 8 mm., the radial ribbing in the anterior valve is shallower than in *L. granifer,* as are also the two radial ribs in the lateral areas.

In conclusion.—A reference to the description of the type (p. 236) will show that the writer separated *L. johnstoni* from *C. recens,* not on lack of correspondence but on the existence in *L. johnstoni* of several striking characters unmentioned by Thiele, the most important of which was the absence of "festooning" in the insertion plate of the anterior valve, a feature that is present in the genus

Callistochiton; as Hull overlooked the absence of this feature in his description of his *granifer,* it is not impossible that Thiele did the same. Now, in comparing the examples sent, Dr. Thiele only mentions as separating characters in his shell, "weaker sculpture and the relatively broader and shorter middle valve." In respect to sculpture, I have already shown herein that the sculpture of *johnstoni,* especially in the ribbing of the lateral areas in the recent example, is much weaker than *L. granifer;* in fact, unless viewed with lateral lighting, the existence of radial ribbing in the lateral areas is imperceptible.

With regard to the proportional longitudinal and lateral measurements, these vary greatly in the median valves of Ashby's type, the single valve sent to Dr. Thiele was longitudinally considerably longer than any of the others; this will account for the apparent difference noted by Thiele. If Thiele's *C. recens* is without "festooning" in the insertion plate of the anterior valve it is certainly a *Lophochiton,* and coming, as it does, from the same locality, namely Shark Bay, both it and Ashby's *L. johnstoni* may safely be considered conspecific. As a result of this discussion we have:—

(a) *Solivaga recens* Thiele of Iredale and Hull becomes *Lophochiton recens* Thiele; their genus *Soliviga* has no known Australian representative, even if it has any justification at all.

(b) Ashby's *Lophochiton johnstoni* becomes a synonym of *Lophochiton recens* Thiele, as was rather anticipated in his type description.

(c) *Callistochiton granifer* Hull becomes a very good subspecies of *Lophochiton recens* Thiele.

Tonica (Lucilina) dilecta Thiele.

Lucilina dilecta Thiele (Die Fauna Südwest-Australiens, iii., p. 397, 1911).

No adequate characters of generic values seem to have been advanced to justify generic separation of *Lucilina* from *Tonicia,* but with some hesitation I am retaining *Lucilina* as having subgeneric status.

Three small specimens were taken off the rocks at low tide four miles south of the homestead, and over a dozen from the same heap of pearl-shell that had been dredged in deeper water, that has before been referred to, these all will be topotypes, as Shark Bay is the type locality. The smallest example, 5 mm. in length, is worthy of mention, it was from the rocks four miles south of the homestead, is of a beautiful pink colour mottled with lighter and darker markings, is much longer in proportion to width than usual, and the lateral areas are strongly raised, showing little if any of the typical sculpture.

Onithochiton quercinus occidentalis, n. sub-sp.

A new name for the *Onithochiton* from Western Australia = *O. scholvieni* Thiele (Die Fauna Südwest-Australiens, iii., p. 1, 1911. Non of Thiele Rev. Chitonen, Chun's Zool. Heft 56, pl. ii., 1910).

Dr. Thiele writes me under date June 25, 1928, in reference to well-preserved examples of this *Onithochiton* I sent him from the north of Shark Bay:—"The small *Onithochitons* from Carnarvon I consider, because of their weak sculpture, not to be *O. scholvieni,* which species, as I have written before, comes from Vaucluse, and also from Sydney." *O. scholvieni* Thiele is, therefore, a synonym of *O. quercinus* Gould, as there is only one species known in that locality.

The known range of *O. quercinus* extends from south of Sydney, in New South Wales, to Mackay, in Queensland. The known range of the Western Australian species extends from Esperance on the South coast, up the west coast to a spot half way between Carnarvon and Maud Landing. This leaves a gap

around the coastline (not following the indentations) of 1,200 miles in Western Australia, 1,100 miles in the Northern Territory, and 1,500 miles in Queensland, or approximately 3,800 miles of coastline between the habitats of the two forms, throughout which immense area of coast, up to the present, we have no knowledge of the presence of either of these species. This fact, combined with the general difference of sculpture, leads one to conclude that we are justified in recognising the western form as at least deserving subspecific separation.

Differences.—I concur in the main with Dr. Thiele in his statement that the western form is weaker than its congener in the east, but I admit, with Iredale and Hull, that very wide variation exists on the eastern species, but on the other hand the western species, in the adult stage, with rare exceptions, is much less sculptured than is the eastern form; in fact, normally the lateral areas in the western are almost, if not quite, unsculptured. Again, the western, which I propose to call *occidentalis,* normally attains a larger size; in fact, the large examples are much the most common. An examination of the respective girdles under 65 mag. leads me to conclude that while the girdles of both forms are densely clothed with shortish, stout, pointed spicules, those on the eastern shells are shorter and stouter in proportion, and also that *O. quercinus* s.s. normally possesses, amongst others, one particular class of spicule that does not occur in *occidentalis,* namely, very short, very stout spicules, usually placed in considerable patches; these spicules either taper abruptly to a fine point or have rounded, knobby apices; these round-ended spicules suggest that the fine point has been broken off at an early stage and then mended by a redeposition of calcareous matter making a well-finished rounded apex, but I doubt whether this is a true explanation of the occurrence.

This *Onithochiton* was very common on the exposed western side of the reef at Surf Point, Dirk Hartog Island. I have selected as the holotype of this subspecies an example collected by myself at Dongarra, Western Australia, on November 10, 1920, taken from the exposed outer reef.

LIOLOPHURA HIRTOSUS (Peron M. S.) Blainville.

Chiton hirtosus Blainville (Dict. Sci. Nat., xxxvi., 1825).

Clavarizona was proposed as a generic name for the reception of this species by Hull (Aust. Zool., iii. p. 199, 1923). Ashby in (Jour. and Proc. Roy. Soc. W. Austr., vol. viii., pp. 32-3, 1921-2) shows that *L. hirtosus* is typically a *Liolophura,* and gives a detailed description of the insertion plate of the tail valve. The characters defined by Hull as justifying his proposed erection of his genus *Clavarizona* are certainly beneath generic status and, therefore, the generic name of *Clavarizona* cannot be accepted. This species was exceedingly numerous on the outer side of the bar at Surf Point, in the same rock holes as the *Onithochiton.*